REMARKS

Status of claims

All claims have been rejected as unpatentable over Yamamura (U.S. patent 6,742,363) alone or in argued combination with Bogdahn (U.S. patent 6,098,428).

Claim 1

Claim 1 has here been revised to incorporate the language of depending claims 3 and 4, and now recites a vertical drawing method for producing a cylindrical glass body that comprises continuously feeding a glass cylinder to a heating zone having a vertically oriented heating tube, zonewise softening the glass cylinder, drawing a glass strand from the softened glass cylinder, cutting the glass strand to size to obtain the cylindrical glass body, and an adjusting operation.

The adjusting operation comprises sensing a value for a first radial xy-position of a longitudinal cylinder axis of the glass cylinder or of a test glass cylinder in a first horizontal sensing plane, drawing the glass cylinder or the test glass cylinder arranged in the first xy-position into a test glass strand, and carrying certain steps once or repeatedly. Those steps comprise a) measuring an actual state of a radial circular or annular dimension of the test glass strand, b) determining a deviation between the actual state and a desired state of the circular or annular dimension relative to a magnitude and position of said deviation relative to an inner wall of the heating tube during drawing, c) calculating a corrected xy-position of the longitudinal cylinder axis on the basis of a correction factor and the magnitude and position of the deviation, d) repositioning the glass cylinder or the test glass cylinder in the heating tube

such that the longitudinal cylinder axis extends at least in the first horizontal sensing plane in the corrected xy-position, and e) drawing the glass cylinder or the test glass cylinder in the corrected xy-position to obtain a further test glass strand. The test glass strand is tubular, and the measurement of the actual state of radial circular or annular dimension of the test glass strand comprises measuring the wall thickness extension of the tubular test glass strand.

The method recited in claim 1 improves the quality of tubular cylinders produced by drawing by improving the dimensional uniformity of the tube, and is not suggested by the prior art. Reconsideration of the rejection is therefore respectfully requested.

Yamamura shows an apparatus for drawing a glass rod. In the Yamamura apparatus, as seen in Fig. 5, glass material 102 is supplied by a hanging mechanism 134 into an elongating furnace 130. See col. 6, lines 44 to 54. An elongating mechanism 140 pulls a glass rod of a reduced diameter from the furnace 130. See col. 5, lines 55 to 58.

In Yamamura, the apparatus is adjusted at setup using a perfectly straight metal or ceramic standard rod 138. See col. 7, lines 44 to 50. This standard rod 138 is placed on the hanging mechanism 134, and the hanging mechanism a134 and the elongating mechanism 140 that draws the rod from the glass material are adjusted in position so that the standard rod 138 held by the device extends exactly along the vertical axis of the device. See col. 8 lines 1 to 16. After this initial setup, the glass rod 106 is drawn by rollers 144a and 144b. Col. 8, lines 17 to 21, col. 9, lines 53 to 55.

During the elongation process, the position control unit 158 calculates the deviation between the center of the rod as it is taken off and the elongating axis 154, i.e., the vertical centerline through the elongating device. See col. 10, lines 6 to 9. Where there is deviation from

the centerline, the speed of the rollers 144a and b is also controlled to bring the rod back to the vertical centerline 154. See col. 10, lines 9 to 16. Deviation from the centerline indicates bending, which is undesirable. See col. 10, lines 17 to 36. Yamamura's system therefore is essentially directed to keeping the rod in a geometric centerline of the elongating apparatus.

In contrast, the method of claim 1 requires measuring of the wall thickness of a tube, not a rod, and correcting the xy-position of that rod so as to obtain a uniform value of that wall thickness, irrespective of whether the tube is in a specific location in the apparatus. This method as claimed yields tubes with reduced lopsidedness. Yamamura's system does not suggest the correction of the position of a drawn tube to the best location for drawing the tube, but simply teaches pulling a rod along a predetermined centerline path of its device. Yamamura therefore does not suggest the claimed method.

Bogdahn shows a system in which a tube is drawn and the wall thickness is detected by device 11. See fig. 1. This information is used to control the speed of drawing and the temperature and pressure of the operation. There is however no suggestion in Bogdahn of the claimed correction of the xy-position of drawing of the tube based on those measurements. Bogdahn therefore also fails to suggest the claimed method.

Reconsideration of the rejection of claim 1 and its depending claims 5 to 11, 18 and 19 is respectfully requested.

Claim 20

Claim 20 as amended recites a method for drawing a glass body from a glass cylinder that comprises positioning the glass cylinder in a vertically oriented heating tube, feeding the

glass cylinder continuously to a heating zone in the heating tube and softening the glass cylinder therein, drawing a glass strand from the softened glass cylinder, and cutting the glass strand to size to obtain the cylindrical glass body. The positioning of the glass cylinder comprises drawing a test strand from the cylinder or from a test cylinder supported with a longitudinal axis extending vertically through an xy-position in a generally horizontal sensing plane, measuring a geometrical attribute of the test strand, deriving a deviation of the geometrical attribute from a desired value of said geometrical attribute, deriving a corrected xy-position from the deviation, and positioning the cylinder or the test cylinder so that the longitudinal axis thereof extends through the corrected xy-position. The geometrical attribute includes a data value indicative of lopsidedness and a data value indicative of the orientation of lopsidedness relative to the heating tube. The test strand is tubular, and the data value indicative of lopsidedness is derived from a plurality of measurements of wall thicknesses of the tubular strand.

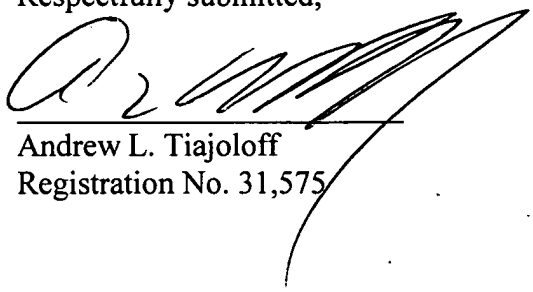
For reasons similar to those set out previously, Yamamura does not suggest such a system because it is concerned only with maintaining the elongated rod in the centerline of the device, not in placing a drawn tube in an xy-position that avoids lopsidedness. Bogdahn does not suggest any adjustment of an xy-position of the tube being drawn. Claim 20 therefore distinguishes over these references as well.

Claims 21 and 24 depend directly or indirectly from claim 20 and therefore distinguish therewith over the cited art.

All claims herein having been shown to distinguish over the prior art in structure, function and result, formal allowance is respectfully requested.

Should any questions arise, the Patent Office is invited to telephone attorney for applicants at 212-490-3285.

Respectfully submitted,



Andrew L. Tiajoloff
Registration No. 31,575

Tiajoloff & Kelly
Chrysler Building, 37th floor
405 Lexington Avenue
New York, NY 10174

tel. 212-490-3285
fax 212-490-3295